



DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. FAA-2022-0891; Project Identifier AD-2022-00585-A,E,R]

RIN 2120-AA64

Airworthiness Directives; Various Airplanes, Helicopters, and Engines

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Notice of proposed rulemaking (NPRM).

SUMMARY: The FAA proposes to adopt a new airworthiness directive (AD) for turbocharged, reciprocating engine-powered airplanes and helicopters and turbocharged, reciprocating engines with a certain v-band coupling installed. This proposed AD was prompted by multiple failures of spot-welded, multi-segment v-band couplings at the tailpipe to the turbocharger exhaust housing flange (also referred to as “spot-welded, multi-segment exhaust tailpipe v-band coupling”). This proposed AD would establish a life limit for the spot-welded, multi-segment exhaust tailpipe v-band coupling and require repetitively inspecting the spot-welded, multi-segment exhaust tailpipe v-band coupling. The FAA is proposing this AD to address the unsafe condition on these products.

DATES: The FAA must receive comments on this proposed AD by [INSERT DATE 100 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

ADDRESSES: You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to www.regulations.gov. Follow the instructions for submitting comments.
- Fax: (202) 493-2251.
- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.
- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

Examining the AD Docket

You may examine the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

FOR FURTHER INFORMATION CONTACT: Thomas Teplik, Aviation Safety Engineer, Wichita ACO Branch, FAA, 1801 S. Airport Road, Wichita, KS 67209; phone: (316) 946-4196; email: thomas.teplik@faa.gov or Wichita-COS@faa.gov.

SUPPLEMENTARY INFORMATION:

Comments Invited

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2022-0891; Project Identifier AD-2022-00585-A,E,R” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to www.regulations.gov, including any personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

Confidential Business Information

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each

page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent Thomas Teplik, Aviation Safety Engineer, Wichita ACO Branch, FAA, 1801 S. Airport Road, Wichita, KS 67209. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

Background

Since the mid-1970s, failures of v-band couplings that attach the exhaust tailpipe to the turbocharger exhaust outlet have resulted in a significant number of incidents and accidents (fatal and non-fatal) on both airplanes and helicopters. Since 1974, National Transportation Safety Board (NTSB) accident and incident investigations have led to the issuance of 7 NTSB Safety Recommendations concerning exhaust systems and/or exhaust v-band couplings; 20 FAA ADs to address the unsafe condition with exhaust systems and/or exhaust v-band couplings; and 10 FAA Special Airworthiness Information Bulletins (SAIBs). Industry has also taken action to raise awareness of the concerns associated with v-band coupling failures.

NTSB Safety Recommendations affecting v-band couplings:

NTSB Safety Recommendation	Description	Make/Model
A-90-166	Exhaust system	Piper PA-32RT-300T, PA-32R-301T
A-90-165	Exhaust system	Piper PA-32RT-300T, PA-32R-301T
A-90-164	Exhaust system	Piper PA-32RT-300T, PA-32R-301T
A-88-151	Exhaust system	Piper PA-32RT-300T
A-88-150	Exhaust system	Piper PA-32RT-300T
A-88-147	Exhaust system	Piper PA-32RT-300T
A-74-099	V-band engine exhaust clamp failures	Textron (Cessna) turbocharged 300/400 series

You may examine these NTSB Safety Recommendations in the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891.

ADs on v-band couplings:

AD	Make/Model
AD 2018-06-11, Amendment 39-19231 (83 FR 13383, March 29, 2018)	Textron Aviation Inc. Model A36TC and B36TC airplanes, all serial numbers, equipped with a turbocharged engine; Textron Aviation Inc. Model S35, V35, V35A, and V35B airplanes, all serial numbers, equipped with the Continental TSIO-520-D engine with AiResearch turbocharger during manufacture; and Textron Aviation Inc. Model S35, V35, V35A, and V35B airplanes, all serial numbers, equipped with StandardAero Supplemental Type Certificate (STC) SA1035WE
AD 2014-23-03, Amendment 39-18019 (79 FR 67340, November 13, 2014)	Piper Aircraft, Inc. Model PA-31P airplanes, serial numbers 31P-1 through 31P-80 and 31P-7300110 through 31P-7730012
AD 2013-10-04, Amendment 39-17457 (78 FR 35110, June 12, 2013; corrected September 5, 2013, 78 FR 54561)	Piper Aircraft, Inc. Model PA-31, PA-31-325, and PA-31-350 airplanes, all serial numbers
AD 2010-13-07, Amendment 39-16338 (75 FR 35619, June 23, 2010; corrected July 26, 2010, 75 FR 43397)	Piper Aircraft, Inc. Model PA-32R-301T airplanes, serial numbers 3257001 through 3257311; and Model PA-46-350P airplanes, serial numbers 4622001 through 4622200 and 4636001 through 4636341
AD 2004-23-17, Amendment 39-13872 (69 FR 67809, November 22, 2004)	Mooney Airplane Company Inc. (currently Mooney International Corporation) Model M20M airplanes, serial numbers 27-0001 through 27-0321
AD 2001-08-08, Amendment 39-12185 (66 FR 20192, April 20, 2001)	Raytheon Aircraft Company (previously The Beech Aircraft Corporation; currently Textron Aviation Inc.) Model 35-C33A, E33A, E33C, F33A, F33C, S35, V35, V35A, V35B, 36, and A36 airplanes, all serial numbers, with Tornado Alley Turbo, Inc. STC SA5223NM and STC SE5222NM incorporated and with a Teledyne Continental engine equipped with a turbonormalizing system
AD 2000-11-04, Amendment 39-11752 (65 FR 34941, June 1, 2000)	Commander Aircraft Company Model 114TC airplanes, serial numbers 20001 through 20027
AD 2000-01-16, Amendment 39-11514 (65 FR 2844, January 19, 2000)	Cessna Aircraft Company (currently Textron Aviation Inc.) Model T310P, T310Q, T310R, 320, 320A, 320B, 320C, 320D, 320E, 320F, 320-1, 335, 340, 340A, 321 (Navy OE-2), 401, 401A, 401B, 402, 402A, 402B, 402C, 404, 411, 411A, 414, 414A, 421, 421A, 421B, and 421C airplanes, all serial numbers
AD 91-21-01 R1, Amendment 39-9470 (61 FR 29003, June 7, 1996;	Textron Lycoming Model TIO-540-S1AD reciprocating engines installed on, but not limited to, Piper Aircraft, Inc. PA-32 series airplanes

AD	Make/Model
corrected September 6, 1996, 61 FR 47051)	
AD 81-23-03 R2, Amendment 39-4491 (47 FR 51101, November 12, 1982)	Cessna (currently Textron Aviation Inc.) Model P210N airplanes, serial numbers P21000001 through P21000811

These ADs require v-band coupling replacements (life limit) and/or repetitive inspections, or changing the type design of the v-band coupling. This proposed AD would not apply to airplanes that have complied with one of these ADs. You may examine these ADs in the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891.

SAIBs on v-band couplings:

SAIB	Subject
CE-18-21	Exhaust Turbochargers; Announce the availability of the “Best Practices Guide for Maintaining Exhaust System Turbocharger to Tailpipe V-band Couplings/Clamps”
CE-18-07	Exhaust Turbocharger; V-band Couplings Used in Engine Exhaust Systems on Turbocharged Reciprocating Engine Powered Aircraft
CE-13-45	Engine Exhaust; Tailpipe V-band Couplings [for turbocharged, reciprocating engine-powered airplanes]
CE-13-07R1	Engine Exhaust; Tailpipe V-band Couplings [for Cessna Aircraft Company (currently Textron Aviation Inc.) Model T206H airplanes]
CE-13-07	Engine Exhaust; Tailpipe V-band Couplings [for Cessna Aircraft Company (currently Textron Aviation Inc.) Model T206H airplanes]
CE-10-33R1	Engine Exhaust [for reciprocating engine-powered airplanes]
CE-10-33	Engine Exhaust [for reciprocating engine-powered airplanes]
CE-09-11	Turbocharged Engines [for turbocharged engine-powered airplanes]
CE-05-13	Alternative method of compliance (AMOC) to AD 91-03-15, Amendment 39-6870 (56 FR 3025, January 28, 1991) for Mooney Aircraft Corporation Model M20M airplanes
CE-04-22	Exhaust System Components for reciprocating engine-powered airplanes
CE-03-46	Mooney Model M20M airplanes with turbocharged engines using v-band clamps

You may examine these SAIBs in the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891.

In spite of these efforts, failures continue to occur and the number of significant safety events continues to increase. As a result, the General Aviation Joint Steering Committee (GA-JSC), which is comprised of both the FAA and industry, developed a working group to study v-band coupling failures associated with turbocharged reciprocating engine-powered aircraft and develop recommended corrective actions. This v-band coupling working group was comprised of aviation industry manufacturers, type/user groups, and government entities. The working group was tasked to examine the turbocharger to tailpipe interface and develop recommendations to enhance the safety of the fleet.

The working group recommended mandatory corrective actions that are tailored to each specific coupling type (spot-welded, riveted, or single piece), thereby minimizing the impact to owner/operators. The working group recommended a mandatory coupling replacement time (life limit) and annual inspection. The working group also recommended non-mandatory actions to aid and educate maintenance personnel in appropriate v-band coupling removal, installation, and inspection practices. Finally, the working group recommended actions for new designs, which incorporate lessons learned from review of the in-service fleet. For new designs incorporating a V-band coupling immediately downstream of the turbocharger exhaust discharge, the working group recommended that a replacement interval (500 hours for spot-welded and 2,000 hours for riveted and single-piece) be incorporated in the Airworthiness Limitations sections of the maintenance manual.

In January 2018, the working group published a final report titled “Exhaust System Turbocharger to Tailpipe V-band Coupling/Clamp Working Group Final Report” (final report). Appendix B of the final report contains the Best Practices Guide. The final report may be found in the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891.

The final report concluded that the common denominator in the incidents and accidents reviewed is the spot-welded, multi-segment exhaust tailpipe v-band coupling (see Figure A). These couplings come in either two or three segment varieties. The segments are the number of v-retainer segments, which are attached to the outer band via spot welds. Although multi-segment exhaust tailpipe couplings can also be riveted, the riveted couplings do not create an unsafe condition.

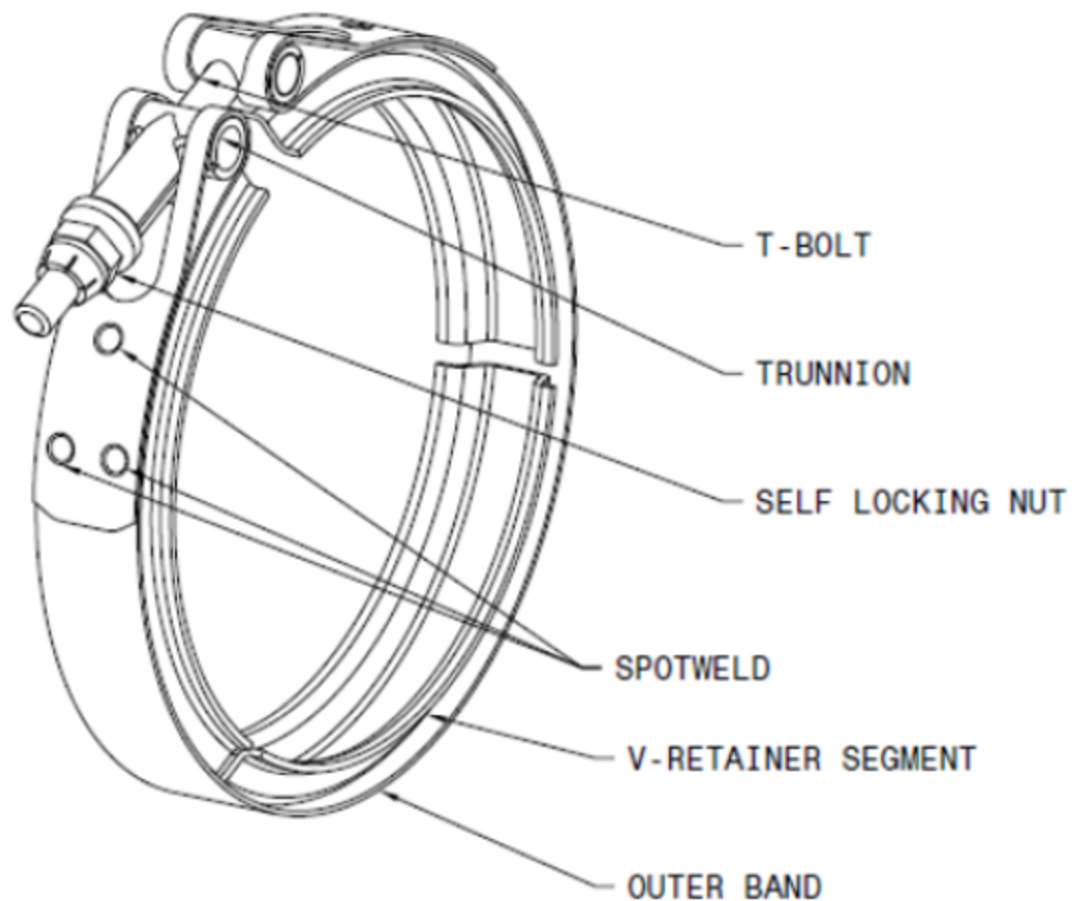


Figure A

Spot-welded, multi-segment exhaust tailpipe v-band coupling

The majority of the events studied by the working group indicated fatigue failure of spot-welded, multi-segment exhaust tailpipe v-band couplings as a result of stress corrosion cracking that originated at or near a spot weld. This is the same unsafe condition identified in the other v-band coupling AD actions previously referenced. The data studied by the working group contained evidence of pre-existing cracking of the couplings, known embrittlement at the spot weld locations simply due to that manufacturing method, and outer band cupping on the multi-segment couplings (which is the result of age, over-use, and potential over-torquing). The working group also found that many of the couplings had safety wire across the bolt end. The safety wire could be helpful if there was a bolt or nut failure (extremely rare events) or the nut was missing. However, the safety wire was of no value when the failure was transverse band cracking and total separation at the spot weld. The data studied by the working group indicated many accidents were due to v-band couplings that were of the multi-segment, spot-welded design, when used in a specific location (the tailpipe to the turbocharger exhaust housing flange on turbocharged reciprocating engine-powered aircraft).

After the working group published the final report, the FAA issued SAIB CE-18-21, dated July 13, 2018. This SAIB announced the availability of the Best Practices Guide from the final report and recommended the public apply the best practices in the maintenance of turbocharged reciprocating engine powered aircraft. The FAA also assessed the recommendations contained in the final report and determined an unsafe condition exists in turbocharged reciprocating engine-powered aircraft with a spot-welded, multi-segment v-band coupling installed. Because these v-band couplings are widely used by many design approval holders on various models (engines and aircraft), several Aircraft Certification Office Branches were involved in the decision to propose a single AD. The FAA also determined that the corrective actions recommended in the final report were appropriate to address this unsafe condition.

This condition, if not addressed, could lead to failure of the spot-welded, multi-segment exhaust tailpipe v-band coupling, leading to detachment of the exhaust tailpipe from the turbocharger and allowing high-temperature exhaust gases to enter the engine

compartment. This could result in smoke in the cockpit, in-flight fire, and loss of control of the aircraft.

FAA's Determination

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

Proposed AD Requirements in this NPRM

This proposed AD would apply to all reciprocating turbocharged airplanes, helicopters, and reciprocating engines that have a spot-welded, multi-segment v-band coupling installed at the tailpipe to the turbocharger exhaust housing flange. The proposed AD would apply regardless of whether the turbocharger is installed as part of the type certificate or under an STC, parts manufacture approval, or field approval. The proposed AD would not apply to airplanes that have complied with certain ADs listed in paragraph (d) of the proposed AD.

This proposed AD would require the following actions:

- Repetitively inspecting the spot-welded, multi-segment exhaust tailpipe v-band couplings annually, regardless of the hours time-in-service (TIS) accumulated on the v-band coupling; and
- Establishing a life limit for the spot-welded, multi-segment exhaust tailpipe v-band couplings by removing them from service every 500 hours TIS.

As an alternative for the first time the spot-welded, multi-segment exhaust tailpipe v-band coupling must be removed from service due to the 500 hour life limit, this proposed AD would allow doing the repetitive inspections every 6 months or 100 hours TIS, whichever occurs first, for a period of 2 years, as long as the v-band coupling continues to pass all of the inspections.

Replacing a spot-welded, multi-segment exhaust tailpipe v-band coupling with a v-band of a different part number or type (riveted or single piece) would not be permitted, unless previously FAA-approved as part of the aircraft or engine type certificate, an STC,

or an AMOC.

Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, could affect up to 41,058 airplanes, helicopters, and engines (products of U.S. registry). The FAA has no way of determining the number of these products that could have an affected spot-welded, multi-segment v-band coupling installed. The FAA's estimated cost on U.S. operators reflects the maximum possible cost based on the 41,058 products of U.S. registry. Based on this, the FAA estimates the following costs to comply with this proposed AD:

Estimated Costs

Action	Labor Cost	Parts Cost	Cost per product	Number of U.S. products	Cost on U.S. operators
Aircraft records review	0.5 work hour x \$85 = \$42.50	N/A	\$42.50	41,058	\$1,744,965
Removal of the coupling from service and replacement (single-engine aircraft)	2 work-hours x \$85 per hour = \$170	\$400	\$570	31,248	\$17,811,360
Removal of the couplings from service and replacement (twin-engine aircraft)	4 work-hours x \$85 per hour = \$340	\$800	\$1,140	9,810	\$11,183,400
Inspection of the coupling without removal (single-engine aircraft)	0.5 work-hour x \$85 per hour = \$42.50	N/A	\$42.50 per inspection cycle	31,248	\$1,328,040 per inspection cycle
Inspection of the couplings without removal (twin-engine aircraft)	1 work-hour x \$85 per hour = \$85	N/A	\$85 per inspection cycle	9,810	\$833,850 per inspection cycle

On Condition costs

Action	Labor Cost	Parts Cost	Cost per product
Inspection of the coupling, including removal and reinstallation (single-engine aircraft)	1.5 work-hours x \$85 per hour = \$127.50	N/A	\$127.50
Inspection of the couplings, including removal and reinstallation (twin-engine aircraft)	3 work-hours x \$85 per hour = \$255	N/A	\$255

This proposed AD would provide operators the option of performing an inspection with the coupling removed from the aircraft instead of an inspection of the coupling without removing it from the aircraft. In some cases, an inspection with the coupling removed may be required.

A coupling may need to be removed from service before it reaches its 500-hour TIS life limit if it does not meet all of the inspection criteria at each inspection. The FAA has no way of determining the number of products that may need to remove the coupling from service before reaching its 500-hour TIS life limit.

Authority for this Rulemaking

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

Regulatory Findings

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national

government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

(1) Is not a “significant regulatory action” under Executive Order 12866,

(2) Would not affect intrastate aviation in Alaska, and

(3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

The Proposed Amendment

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

PART 39 - AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

Various Airplanes, Helicopters, and Engines: Docket No. FAA-2022-0891; Project Identifier AD-2022-00585-A,E,R.

(a) Comments Due Date

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 100 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

(b) Affected ADs

None.

(c) Definitions

(1) For purposes of this AD, a “v-band coupling” means a spot-welded, multi-segment v-band coupling installed at the tailpipe to turbocharger exhaust housing flange.

(2) For purposes of this AD, “new” means zero hours time-in-service (TIS).

(d) Applicability

This AD applies to all turbocharged, reciprocating engine-powered airplanes and helicopters and turbocharged, reciprocating engines, certificated in any category, with a spot-welded, multi-segment v-band coupling installed at the tailpipe to turbocharger exhaust housing flange, except for airplanes that are in compliance with an AD listed in paragraphs (d)(1) through (10) of this AD. These v-band couplings are installed on, but not limited to, the products listed in Table 1 to paragraph (d) of this AD.

(1) AD 2018-06-11, Amendment 39-19231 (83 FR 13383, March 29, 2018).

(2) AD 2014-23-03, Amendment 39-18019 (79 FR 67340, November 13, 2014).

(3) AD 2013-10-04, Amendment 39-17457 (78 FR 35110, June 12, 2013; corrected September 5, 2013, 78 FR 54561).

(4) AD 2010-13-07, Amendment 39-16338 (75 FR 35619, June 23, 2010; corrected July 26, 2010, 75 FR 43397).

(5) AD 2004-23-17, Amendment 39-13872 (69 FR 67809, November 22, 2004).

(6) AD 2001-08-08, Amendment 39-12185 (66 FR 20192, April 20, 2001).

(7) AD 2000-11-04, Amendment 39-11752 (65 FR 34941, June 1, 2000).

(8) AD 2000-01-16, Amendment 39-11514 (65 FR 2844, January 19, 2000).

(9) AD 91-21-01 R1, Amendment 39-9470 (61 FR 29003, June 7, 1996; corrected September 6, 1996, 61 FR 47051).

(10) AD 81-23-03 R2, Amendment 39-4491 (47 FR 51101, November 12, 1982).

Table 1 to Paragraph (d) – Applicability Includes, but is not Limited to, the Following Airplanes, Helicopters, and Engines When Turbocharged

Type Certificate Holder	Model
Aerostar Aircraft Corporation	PA-60-600 (Aerostar 600), PA-60-601 (Aerostar 601), PA-60-601P (Aerostar 601P), PA-60-602P (Aerostar 602P), and PA-60-700P (Aerostar 700P)
B-N Group Ltd. (formerly Pilatus Britten-Norman Limited)	BN-2, BN-2A, BN-2A-6, BN-2A-8, and BN-2A-9
Cirrus Design Corporation	SR22, SR22T

Type Certificate Holder	Model
Commander Aircraft Corporation (formerly CPAC, Inc.; Commander Aircraft Company; Gulfstream Aerospace Corporation; Gulfstream American Corporation; and Rockwell International, Commander Aircraft Division)	112TC, 112TCA, and 114TC
Continental Aerospace Technologies, Inc. (formerly Continental Motors, Inc., and Teledyne Continental Motors)	LTSIO-360-E, LTSIO-360-EB, LTSIO-360-KB, LTSIO-360-RB; TSIO-360-E, TSIO-360-EB, TSIO-360-F, TSIO-360-FB, TSIO-360-KB, TSIO-360-LB, TSIO-360-MB, TSIO-360-RB, TSIO-360-SB; TSIO-520-BE, TSIO-520-L, TSIO-520-LB, TSIO-520-T, TSIO-520-WB; TSIO-550-A, TSIO-550-B, TSIO-550-C, TSIO-550-E, TSIO-550-G, TSIO-550-J, TSIO-550-K, TSIO-550-N; TSIOF-550-D, TSIOF-550-J, IO-520-B, IO-520-BA, IO-520-BB, IO-520-D, IO-550-B, IO-550-E, and IO-550-N
Costruzioni Aeronautiche Tecnam S.P.A.	P2012 Traveller
Daher Aerospace (formerly SOCATA and SOCATA - Groupe AEROSPATIALE)	TB 21
Diamond Aircraft Industries Inc. (formerly Diamond Aircraft Industries GmbH)	DA 40
The Enstrom Helicopter Corporation	F-28C, F-28C-2, F-28C-2R, F-28F, F-28F-R, 280C, 280F, and 280FX
Helio Aircraft LLC	500
Helio Alaska, Inc.	H-295 (USAF U-10D) and H-395 (USAF L-28A or U-10B)
The King's Engineering Fellowship (formerly Evangel-Air)	4500-300 and 4500-300 Series II
Lycoming Engines (formerly Textron Lycoming)	IO-540-AA1A5, IO-540-AG1A5, IO-540-S1A5, TIO-540-AE2A, TIO-540-AH1A, TIO-540-J2BD, TO-360-C1A6D, TO-360-E1A6D, LTO-360-A1A6D, LTO-360-E1A6D, and LTIO-540-J2BD
Maule Aerospace Technology, Inc. (formerly Maule Aircraft Corporation)	M-5-210TC
Merlyn Products, Inc.	IO-540-MX1
Mooney International Corporation (formerly Mooney Aviation Company, Inc.; Mooney Airplane Company, Inc.;	M20J, M20K, M20M, M20TN, and M20V

Type Certificate Holder	Model
Mooney Aircraft Corporation; Aerostar Aircraft Corporation of Texas; and Mooney Aircraft Inc.)	
Piper Aircraft, Inc. (formerly The New Piper Aircraft, Inc.)	PA-23, PA-23-160, PA-23-235, PA-23-250, PA-23-250 (Navy UO-1), PA-E23-250, PA-24-250, PA-24-260, PA-24-400, PA-28-201T, PA-28R-201T, PA-28RT-201T, PA-30, PA-31, PA-31-325, PA-31-350, PA-31P, PA-31P-350, PA-32-260, PA-32R-300, PA-32RT-300T, PA-32R-301(SP), PA-32-301T, PA-32R-301T, PA-34-200, PA-34-200T, PA-34-220T, PA-39, PA-44-180T, PA-46-310P, and PA-46-350P
Revo, Incorporated (formerly Global Amphibians, LLC; Consolidated Aeronautics, Inc.; Lake Aircraft Corporation; and Colonial Aircraft Company)	Lake Model LA-4, Lake Model LA-4A, Lake Model LA-4-200, and Lake Model 250
Scott's-Bell 47, Inc. (formerly Bell Helicopter Textron Inc.)	47G-3B, 47G-3B-1, 47G-3B-2, and 47G-3B-2A
Siam Hiller Holdings, Inc. (formerly Rogerson Hiller Corporation; Hiller Helicopters; Rogerson Aircraft Corporation; Hiller Aviation; Heli-Parts, Inc.; Fairchild Industries, Inc.; and Hiller Aircraft Corporation)	UH-12L and UH-12L4
SST FLUGTECHNIK GmbH (formerly Extra Flugzeugproduktions- und Vertriebs- GmbH and Extra Flugzeugbau GmbH Flugplatz)	EA 400
Textron Aviation Inc. (formerly Beechcraft Corporation, Hawker Beechcraft Corporation, Raytheon Aircraft Company, and Beech Aircraft Corporation)	35-33, 35-A33, 35-B33, 35-C33, 35-C33A, E33, E33A, E33C, F33, F33A, F33C, H35, J35, K35, M35, N35, P35, S35, V35, V35A, V35B, 36, A36, A36TC, B36TC, D55, E55, 56TC (Turbo Baron), A56TC (Turbo Baron), 58, G58, 60 (Duke), A60 (Duke), B60 (Duke), 95, 95-C55, B95, B95A, D95A, and E95
Textron Aviation Inc. (formerly Cessna Aircraft Company)	185, 185A, 185B, 185C, 185D, 185E, A185E, A185F, A188, A188A, A188B, A188C, T182, T182T, TR182, T188C, 206, P206, P206A, P206B, P206C, P206D, P206E, T206H, TP206A, TP206B, TP206C, TP206D, TP206E, TU206A, TU206B, TU206C, TU206D, TU206E, TU206F,

Type Certificate Holder	Model
	TU206G, U206, U206A, U206B, U206C, U206D, U206E, U206F, U206G, T207, T207A, 210, 210A, 210B, 210C, 210-5 (205), 210-5A (205A), P210N, T210G, T210H, T210J, T210K, T210L, T210M, T210N, T240, T303, 310, 310B, 310C, 310D, 310E (USAF U-3B), 310F, 310G, 310H, 310I, 310J, T310P, T310Q, T310R, 320, 320A, 320B, 320C, 320D, 320E, 320F, 320-1, 321, 335, 340, 340A, LC40-550FG, LC41-550FG, LC42-550FG, FT337E, FT337F, FT337GP, FT337HP, P337H, T337B, T337C, T337D, T337E, T337F, T337G, T337H, T337H-SP, 401, 401A, 401B, 402, 402A, 402B, 402C, 404, 411, 411A, 414, 414A, 421, 421A, 421B, 421C
Triton Aerospace LLC (formerly Triton America LLC; AAI Acquisition, Inc.; and Adam Aircraft)	A500
Twin Commander Aircraft LLC (formerly Twin Commander Aircraft Corporation; Gulfstream Aerospace Corporation; Gulfstream American Corporation; Rockwell-Standard & Associates; and Aero Design and Engineering Company, also known as Aero Commander Aircraft)	500, 500A, 500B, 500S, 500U, 560A, 560E, and 685
Vulcanair S.p.A. (formerly Partenavia Costruzioni Aeronautiche S.p.A.)	P.68B, P.68C-TC, and P.68TC "Observer"

(e) Subject

Joint Aircraft System Component (JASC) Code 8100, Exhaust Turbine System (Recip).

(f) Unsafe Condition

This AD was prompted by multiple failures of spot-welded, multi-segment v-band couplings installed at the tailpipe to turbocharger exhaust housing flange. The FAA is issuing this AD to prevent failure of the spot-welded, multi-segment exhaust tailpipe v-band coupling. The unsafe condition, if not addressed, could lead to detachment of the exhaust tailpipe from the turbocharger and allow high-temperature exhaust gases to enter

the engine compartment. This could result in smoke in the cockpit, in-flight fire, and loss of control of the aircraft.

(g) Compliance

Comply with this AD within the compliance times specified, unless already done.

(h) Review of the Maintenance Records

Within 50 hours TIS after the effective date of this AD, review the aircraft maintenance records to determine the number of hours TIS accumulated on each v-band coupling.

(i) V-band Coupling Life Limit

(1) Within the compliance times specified in paragraph (i)(1)(i) or (ii) or (i)(2) of this AD, remove the v-band coupling from service and install a new v-band coupling. Apply correct torque as necessary to the v-band coupling nut.

(i) If the v-band coupling has accumulated less than 500 hours TIS: Initially remove the v-band coupling from service before it accumulates 500 hours TIS or within 50 hours TIS after the effective date of this AD, whichever occurs later. Thereafter, remove the v-band coupling from service before it accumulates 500 hours TIS.

(ii) If the v-band coupling has accumulated 500 or more hours TIS or if the hours TIS of the v-band coupling cannot be determined: Initially remove the v-band coupling from service within 50 hours TIS after the effective date of this AD. Thereafter, remove the v-band coupling from service before it accumulates 500 hours TIS.

(2) As an alternative to initially removing the v-band coupling from service as required by paragraph (i)(1) of this AD, you may perform the inspections required by paragraphs (j)(1) through (7) or (k) of this AD. Do the initial inspections at the time the v-band coupling would have been removed from service and thereafter at intervals not to exceed 6 months or 100 hours TIS, whichever occurs first, for a period not to exceed 2 years after the effective date of this AD. If the v-band coupling fails to meet any inspection criteria in paragraphs (j)(1) through (7) or (k) of this AD, it must be removed from service before further flight.

Note 1 to paragraph (i): Instructions for installing a v-band coupling can be found in Appendix B: Best Practices Guide, paragraph 3.1, of the “Exhaust System

Turbocharger to Tailpipe V-band Coupling/Clamp Working Group Final Report,” dated January 2018.

(j) Inspections Without Removal of the V-band Coupling

At the next annual inspection after the effective date of this AD or within the next 12 months after the effective date of this AD, whichever occurs first, and repetitively thereafter at intervals not to exceed 12 months, visually inspect the v-band coupling as required by paragraphs (j)(1) through (7) of this AD. Removing the v-band coupling from service and installing a new v-band coupling does not terminate the requirement to do these repetitive inspections.

(1) Inspect the v-band coupling and area around the v-band coupling for exhaust stains, sooting, and discoloration. If any of those conditions are found, remove the coupling and, instead of the inspections in paragraphs (j)(2) through (7) of this AD, do the inspections in paragraph (k) of this AD.

(2) Inspect the v-band coupling outer band for cracks, paying particular attention to the spot weld areas. If there is a crack, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(3) Inspect the v-band coupling for looseness and for separation of the outer band from the v-retainer segments at all spot welds. If there is any looseness or separation of the outer band from any retainer segment, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(4) Inspect the v-band coupling outer band for cupping, bowing, and crowning as depicted in figure 1 to paragraph (k)(1)(iii) of this AD. If there is any cupping, bowing, or crowning, before further flight, remove the coupling and, instead of the inspections in paragraphs (j)(5) through (7) of this AD, do the inspections in paragraph (k) of this AD.

(5) Inspect the area of the v-band coupling, including the outer band, opposite the t-bolt for damage and distortion. If there is any damage or distortion, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(6) Using a mirror, inspect the v-band coupling to determine whether there is a space between the two v-retainer coupling segments next to the t-bolt. If there is no space

between the two v-retainer coupling segments next to the t-bolt, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(7) Determine whether the v-band coupling nut is properly torqued and apply correct torque as necessary.

(k) Inspections with the Spot-welded, Multi-segment Exhaust Tailpipe V-band Coupling Removed

(1) Remove the v-band coupling and do the inspections in paragraphs (k)(1) and (2) of this AD if required by paragraph (j)(1) or (4) of this AD or as an alternative to the inspections required by paragraph (j) of this AD. Removing the v-band coupling from service and installing a new v-band coupling does not terminate the requirement to repeat the inspections in paragraph (j) or (k) of this AD.

(i) Using crocus cloth and mineral spirits or Stoddard solvent, clean the outer band of the v-band coupling. Pay particular attention to the spot weld areas on the v-band coupling. If there is corrosion that cannot be removed by cleaning or if there is pitting, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(ii) Using a 10X magnifying glass, visually inspect the outer band for cracks, paying particular attention to the spot weld areas. If there is a crack, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(iii) Visually inspect the flatness of the outer band using a straight edge. Lay the straight edge across the width of the outer band as depicted in figure 1 to paragraph (k)(1)(iii) of this AD. If the gap between the outer band and the straight edge exceeds 0.062 inch, before further flight, remove the v-band coupling from service and install a new v-band coupling.

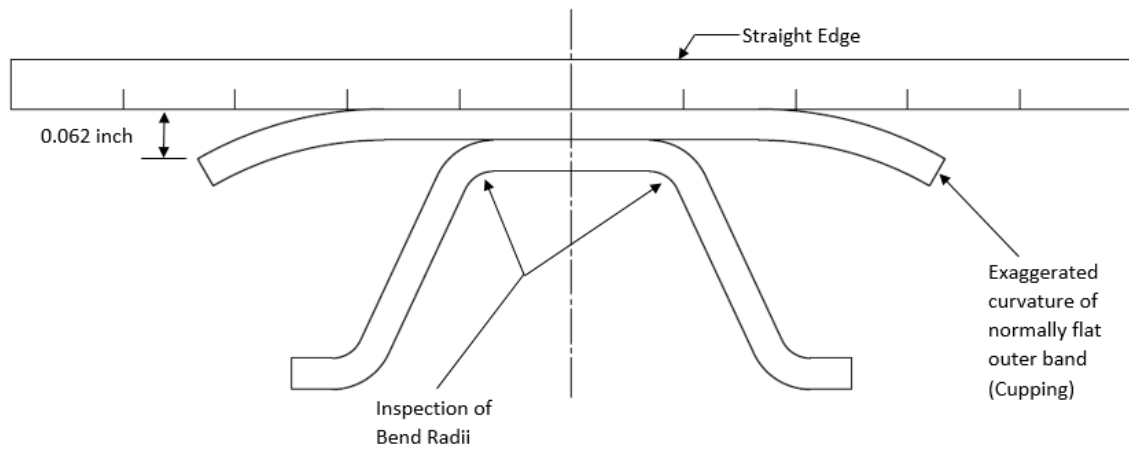


Figure 1 to paragraph (k)(1)(iii) – Inspection Depiction

(iv) With the t-bolt in the 12 o'clock position, visually inspect the attachment of the outer band to the v-retainer coupling segments for gaps between the outer band and the v-retainer coupling segments from the 1 o'clock through 11 o'clock positions. If there are any gaps between the outer band and the v-retainer coupling segments, before further flight, remove the v-band coupling from service and install a new v-band coupling.

Note 2 to paragraph (k)(1)(iv): You may use backlighting to see gaps.

(v) Visually inspect the bend radii of the v-retainer coupling segments, throughout the length of the segment, as depicted in figure 1 to paragraph (k)(1)(iii) of this AD, for cracks. If there are any cracks, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(vi) Visually inspect the outer band opposite the t-bolt for damage (distortion, creases, bulging, or cracks) caused by excessive spreading of the coupling during installation or removal. If there is any damage, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(2) If the v-band coupling passes all of the inspections in paragraphs (k)(1)(i) through (vi) of this AD, it may be re-installed.

(i) Apply correct torque as necessary to the v-band coupling nut.

(ii) Inspect the v-band coupling to determine whether there is space between the two v-retainer coupling segments next to the t-bolt. If there is no space between the two

v-retainer coupling segments next to the t-bolt, before further flight, remove the v-band coupling from service and install a new v-band coupling.

(l) Installation Prohibitions

(1) From the effective date of this AD until two years after the effective date of this AD, do not install a v-band coupling that has accumulated more than zero hours TIS on any turbocharged airplane, helicopter, or engine, unless it has passed all inspections required by paragraph (j) or (k) of this AD.

(2) As of two years after the effective date of this AD, do not install a v-band coupling that has accumulated more than zero and less than 500 hours TIS on any turbocharged airplane, helicopter, or engine, unless it has passed all inspections required by paragraph (j) or (k) of this AD.

(3) As of two years after the effective date of this AD, do not install a v-band coupling that has accumulated 500 or more hours TIS on any turbocharged airplane, helicopter, or engine.

(m) Alternative Methods of Compliance (AMOCs)

(1) The Manager, Operational Safety Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the Operational Safety Office, send it to the attention of the person identified in paragraph (n)(1) of this AD and email to: AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

(n) Related Information

(1) For more information about this AD, contact Thomas Teplik, Aviation Safety Engineer, Wichita ACO Branch, FAA, 1801 S. Airport Road, Wichita, KS 67209; phone: (316) 946-4196; email: thomas.teplik@faa.gov or Wichita-COS@faa.gov.

(2) The “Exhaust System Turbocharger to Tailpipe V-band Coupling/Clamp Working Group Final Report,” dated January 2018, may be found in the AD docket at www.regulations.gov by searching for and locating Docket No. FAA-2022-0891.

(o) Material Incorporated by Reference

None.

Issued on July 20, 2022.

Christina Underwood, Acting Director,
Compliance & Airworthiness Division,
Aircraft Certification Service.

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